

Sensory gardens: Assessing their design and use

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This article investigates the design and use of sensory gardens by evaluating their zones and how they are utilized. Preliminary site studies were undertaken in 14 sensory gardens around the UK, followed by more detailed data collection at two case-study sites. The aim was to discover features that enable user behaviours and use of spaces in sensory gardens. The data collection included interview, observation and behaviour mapping, which is used in conjunction with affordance theory. The findings from the data analysis also draw on Moore and Cosco's multi-method approach.

Keywords: affordance; design; pathway; sensory garden; use

INTRODUCTION

What is a sensory garden? It is a 'self-contained area that concentrates a wide range of sensory experiences. Such an area, if designed well, provides a valuable resource for a wide range of users, from education to recreation' (Sensory Trust, 2009).

What makes a sensory garden different from any other garden? 'The only difference in a sensory garden is that all components (hard landscaping, soft landscaping, colours, textures and wildlife) must be carefully chosen and designed to appeal to the senses in such a way that they provide maximum sensory stimulation' (Lambe, 1995).

In an interview that the author conducted in 2006 with Jane Stoneham, director of the Sensory Trust and co-author of the book, *Landscape Design for Elderly and Disabled People* (Stoneham and Thoday, 1994), Stoneham stated that the initial idea of sensory gardens derived from the horticultural therapy movement, which developed in the UK in the 1970s. Horticultural therapy was focused

on special environments, i.e. hospitals and rehabilitation units and, as a result, developed more rapidly than sensory gardens. One positive aspect of sensory gardens was the genuine response to meet the needs of visually impaired people.

Stoneham added, however, there was not really much thought given to the design of these gardens. The first sensory gardens were often located in public parks because the local authority would have decided that it was a way of showing that they were implementing inclusion strategies. However, the reality was that they were small areas, often signposted as 'Garden for the Blind', and they consisted of a combination of scented plants, Braille labels and raised planters.

Stoneham further added that in the 1980s, visually impaired people challenged the initial ideas about 'gardens for the blind' because the issue of being segregated from able-bodied people was itself beginning to be challenged. It is now widely understood that disabled people

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do not want to be segregated from able-bodied people in their enjoyment of green areas. Thoday and Stoneham (1996) agreed with this idea, 'the *sensory landscapes* should be a way of introducing much greater interest and variety into green areas for everyone to enjoy and should not result in *gardens for the disabled*'. The basic idea is to integrate green areas that will allow an enhanced sensory experience, which will make for a more sustainable and inclusive approach rather than making 'special' provision for disabled people (O'Connell and Spurgeon, 1996).

Based on the sensory gardens visited during the preliminary site studies, the author decided to select school-based sensory gardens, which were designed by a landscape architect, because out of the 14 sensory gardens visited, two of them had potential as case-study examples, namely the Royal School for the Deaf and Communication Disorders in Cheshire (RSDCD) and Lyndale School in Wirral (LS). Both of these special schools are in the UK.

THEORETICAL PERSPECTIVES

'A key of understanding the implications of the built environment and children's active living is the concept of affordance' (Gibson and Pick, 2000, quoted in Cosco, 2007). 'It helps us to understand the impact of the physical environment on children and to identify environmental attributes that are associated with specific behavioural responses' (Gibson and Pick, 2000, quoted in Cosco, 2006). The approach can be understood through three concepts: affordance, information and pickup information (Gibson and Pick, 2000).

AFFORDANCE

'Affordance is the perceived functional significance of an object, event or place for an individual' (Heft, 2001). Affordance is generally defined as the functionally significant properties of physical opportunities and dangers, which an organism perceives while acting in a specific setting (Gibson, 1986; Gibson and Pick, 2000; Heft, 2001; Kyttä, 2003). In other words, the environment features as a property of the relationship between the environment and the users and the possibilities

that a place can offer users, whether or not the designers intended those possibilities. Thus the concept of affordance, in Gibson's ecological approach, has been applied to 'examine the relationship between the functional properties of the environment and how environments are used' (Clark and Uzzel, 2002).

Children's engagement with the environment can be divided into two levels of affordances: actualized and potential (Kyttä, 2003). Actualized affordances are what the children encounter during their independent mobility, perception and engagement with the environmental features (Heft, 1999; Kyttä, 2002, 2003, 2004, 2006). Potential affordances are different for each individual and each specific group of people, depending on how their physical skills or bodily proportions, social needs and personal intentions are matched with the environmental features (Kyttä, 2002, 2003, 2006). In this research, the actualized affordances recorded the activities users undertook that were afforded by the design of the sensory garden. The potential affordances recorded a feature in the garden, such that it had the potential to offer an affordance, but there was some design limitation that hindered uptake by the users.

Users perceive two types of affordances: positive and negative (Kyttä, 2003). Both of these types are determined by the quality of the features that can be perceived through their senses. Positive affordances relate to the children's movements and their perceptions of the environment, resulting in them finding it satisfying, appealing and friendly, whereas negative affordances induce feelings of avoidance, danger, escape and fear (Heft, 1999; Kyttä, 2003). However, children may also be interested in engaging with features that are unsafe as they like to take risks when they are active in their surroundings (Hart, 1979; Kyttä, 2003). In this research, positive and negative affordances recorded different users' responses to their experience of the sensory garden. Findings from the observation and behavioural mapping showed that both case-study sensory gardens afforded more positive affordances than negative ones.

INFORMATION

The environment's surfaces, boundaries, events, objects and layout all provide information to users (Gibson and Pick, 2000). The information perceived changes depending on the perceiver's movement (sitting, standing, walking, etc.) and their senses (sight, hearing, taste, touch and smell). These changes are essential for identifying, extracting and describing information about where one is, where one is going and what one is accomplishing. For example, users passing the sensory garden often stop for a while to engage with features that are adjacent to the pathway. Their engagement enables them to experience different views of the garden.

INFORMATION PICKUP

There are two types of information pickup: exploratory and performatory (Gibson and Pick, 2000). The former permits children to discover new properties of the environment and their own capabilities, whereas the latter is the outcome of already learned affordances and relates to actions directed towards objects or individuals within a setting for an intended purpose, for example, throwing, hitting, etc. What is perceived by the perceiver is not the abstraction of light, colour, form, space or other sensory properties, but integration as a whole of the layout, objects and events (Gibson and Pick, 2000).

The layout of the environment is the composition of surfaces that we walk on, the walls that enclose and the canopies that shelter us. Objects can be animate or inanimate, and include people, animals, plants and objects to sit on, etc. Events refer to the movements and actions that occur in the particular layout in relation to the objects. These three perceptual categories assist users in locating and orientating themselves; thus users will gain confidence in finding their way around their environment.

ENVIRONMENT AND BEHAVIOUR RESEARCH

Even though gardens have long been recognized as a therapeutic environment, there has been little empirical study evaluating how gardens support users' well-being (Whitehouse

et al., 2001; Cooper-Marcus, 2002). In addition, the author had discovered a lack of rigorous research on sensory gardens. However, there is some closely related work on other types of outdoor environment, namely hospital gardens (Whitehouse et al., 2001) and inclusive parks (Moore and Cosco, 2007). These studies, which have some insights into the impact of a garden on users' well-being and behaviour, were also relevant to this research in terms of their theoretical framework, methods and findings.

Although there are many publications on sensory environments, e.g. Snoezelen¹ (Long and Haigh, 1992; Cavet and Mount, 1995) and disabled persons' needs (anthropometrics) (Harris and Dines, 2005), the study of sensory gardens demands research into both the environment and behaviour, because such gardens must be designed, maintained and managed to fulfil the users' needs. In order to meet those needs, designers must understand how the users behave, use and engage with the features in the sensory garden. During the preliminary site studies, the author had discovered that there are many precedents set for sensory environments, but that none of them are designed to fulfil the users' needs. Thus, environment and behaviour research that includes systematic investigation of the relationships between the environment and human behaviour, and their application in the design of sensory gardens, is needed.

METHOD

Figure 1 shows the sequential method used for data collection with the landscape architects, teachers and therapists for their respective sensory gardens.

ANALYSIS AND RESULTS ANALYSIS AND RESULTS OF THE BEHAVIOURAL OBSERVATION

The measures undertaken during the observation period to enable user engagement with the features and the richness of activities in the sensory garden are as follows:

- Activities and affordances occurred refers to the number of main activities and actualized

Method	Respondents	Objectives
Interview with the landscape architects: At the place of their choice During a walkthrough in the sensory garden	RSDCD (n=1) LS (n=1)	To investigate the design process and landscape architect's intention. To allow subsequent assessment of whether users utilize the space and elements in the way they are meant to



Method	Respondents	Objectives
Interview with the teachers and therapists	RSDCD: Teachers (n=4) Therapists (n=2) LS: Teachers (n=6) Therapists (n=3)	To enquire into their experience of and benefits in having the sensory garden. To assess the garden elements and any problems identified in the sensory garden



Data collection about the usage of the sites by all users

Method	Respondents	Objectives
Observation and behavioural mapping	RSDCD: All users LS: All users	To understand how users behave and take advantage of affordances in space. To categorize all the different types of use (behaviour)



Method	Respondents	Objectives
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Interviews with the students	RSDCD: Students (n=3) LS: Students (n=6)	To understand how students behave in the sensory garden thus providing information that observation alone cannot provide. To get information first hand from the students and to obtain their own responses
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FIGURE 1 Summary of the data collection at the chosen case-study sites

affordances, and which occurred most and least frequently in each zone of the sensory garden.

- Features engaged with are the quantity of items of hard landscape (hard surfaces, structures, raised planters, water feature, artefacts); soft landscape (plants, animals, microclimate); and landscape furniture (seating, lighting bollards), which users have played with/in/among, encountered or visited.
- Length of engagement with is the timespan, in minutes and seconds, of the users' main activities and the actualized affordances in each zone of the sensory garden.

The data show the link between features and the number of actualized affordances (unique and multiple affordances), and the number of users and the median time spent per person in the different zones of the sensory garden (the zones of the garden refers to the total area covered, in square metres). Unique affordances mean a single opportunity of activity engaged in by users while in a specific setting. Multiple affordances

mean two or more opportunities for the activities engaged in by users while in a specific setting.

The graph in Figure 2 shows that zone A (parents' waiting area – see Figure 3) had the highest frequency of users and main activities ($n = 4254$), followed by zone D (green space two) at 3679. Although zone C (green space one) had the third largest area, the frequency of users and main activities was lowest, at 73, whereas zone B (Exploraway) had 397. The results suggest that the accessibility of features in zones A, D, E and F afforded many functional properties related to engaging users in activities. In summary, the users' activities in the sensory garden were not dependent on the total area of each zone, but rather the functionality of the features and the ease of accessibility.

ANALYSIS AND RESULTS OF THE AFFORDANCES

When the results for the total area were compared with the frequency of actualized affordances and the median time spent per user (Figure 4), this provided a better understanding of patterns of use.

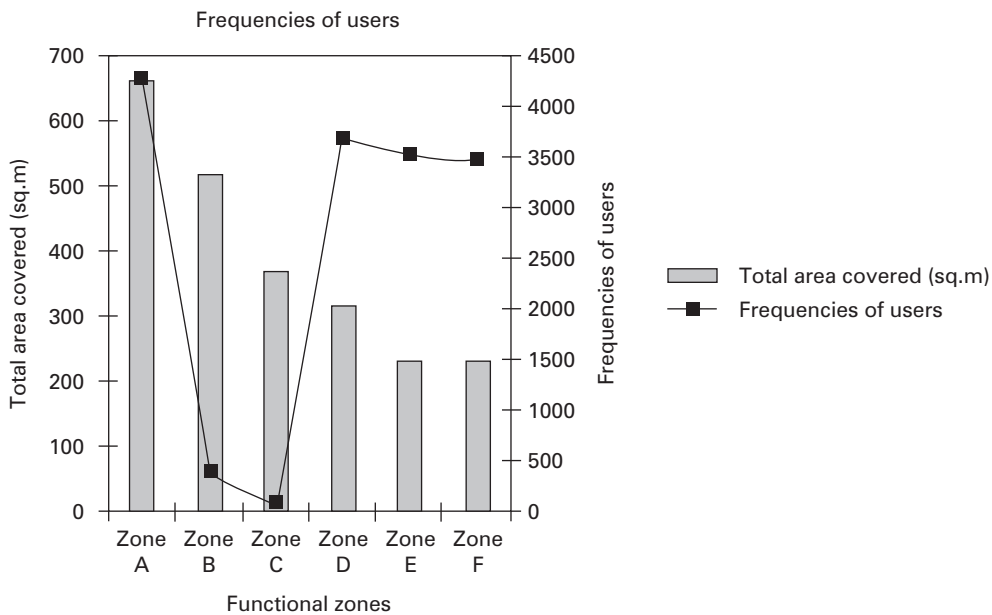


FIGURE 2 Frequencies of users recorded in one of the case studies, according to the zones



FIGURE 3 Zone A (parents' waiting area)

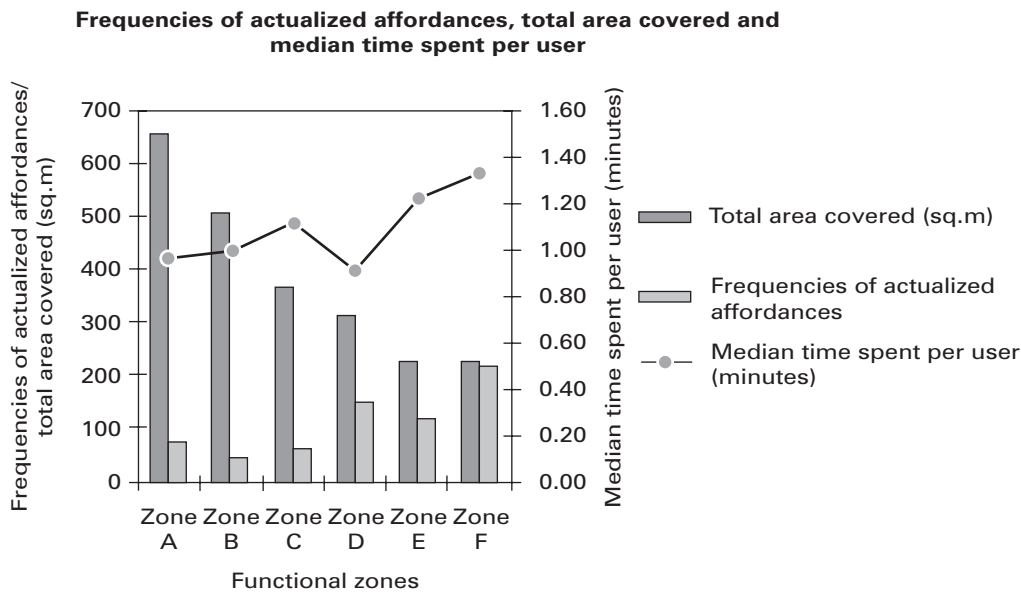


FIGURE 4 The pattern of actualized affordances with the total area that users engaged and their median time spent per user, as recorded in one of the case studies. Note: The total frequency of actualized affordances is equivalent to the total number of users (shown as 'n' value)

Zone F (water central area – see Figure 5) had the greatest frequency of actualized affordances ($n = 218$), the longest median time spent per user (1 minute 20 seconds) and offered eight features. This zone had a high preference despite a few disadvantages recorded during

the observation and behaviour mapping. In comparison with zone A (parents' waiting area), which had the largest area, 58 seconds median time spent per user (73 users) and also offered eight features, zone F was smaller but frequently used (see Figure 2). The number of users,



FIGURE 5 Zone F (water central area)

therefore, was influenced by the functional values of the features; however, the number of features and the total area of each zone did not appear to correlate with the median length of time spent there per user.

KEY CONCLUSIONS

In conclusion, a combination of soft and hard landscape and landscape furniture places adjacent to a continuous primary pathway that offered easy access to the functional features recorded the highest preferences. In other words, the layout of the pathway network linking the sensory garden to the overall site context is crucial in encouraging the number of users who will engage with the features placed along it. It does not matter what sort of features are included (a combination of soft and hard landscape and landscape furniture) to offer variety to users – as long as they are accessible and functional, users will be engaged by them.

This finding echoed research undertaken by Moore and Cosco (2007) on inclusive parks, which showed that a highly positive feature and the one that was most popular among users, was a wide pathway that gave access to the facilities that were readily accessible. Another of their findings was that a meandering pathway afforded inclusion and added visual interest to the pedestrian experience. This raised another question in the author's mind about the direct pathway at the RSDCD compared with the curvy

one at the LS. Does the formation of a path play an important role in encouraging the richness of affordances and behaviour? The study looked back at the overall design framework related to the path layout of both sensory gardens.

The landscape architect intended, when designing the RSDCD's sensory garden, to provide a strong overall framework that would: channel and encourage movement from one area to the other individual areas; improve the sense of direction; offer paths of different widths and textures; and provide areas that offered a rich experience within a protected environment. For the LS, the landscape designer intended to maximize the potential of the site with landform and create a meandering pathway network that would provide a range of options and opportunities to move through spaces along the way. When the distribution of users and frequencies of use in both sensory gardens were compared, which were recorded throughout the observation period, it seemed apparent that users preferred to stroll on continuous pathways, which linked one zone to the next with readily accessible and functional features that were adjacent to the pathways.

It is the layout of the pathway, therefore, that enables user behaviour and use of area rather than users seeking out corners or zones with particular features. This is significant new knowledge, from a design point of view, indicating that pathway layout is more important than the particular design of features, as long as the pathways are accessible. What they should be designing is something more like a 'sensory trail'. But how is a 'sensory trail' different from a sensory garden?

In a sensory garden, users are encouraged to maximize their enjoyment and engagement of their senses. The features in a sensory garden that the landscape architect wants to be particularly enjoyed need to be adjacent to the pathway. Ideally, a sensory garden should have a continuous circulation network that links all zones of the garden with easy access to the different features. Thus, what a landscape architect should be designing is a garden that is linked by a sensory trail, but the sensory trail in one sense becomes a sensory garden.

NOTE

- 1 The word Snoezelen 'was a contraction of two Dutch words, meaning to smell and to doze. The idea came from Hulsegge and Verhuel (1987) and was developed in residential institutions related to recreation and leisure for adults rather than in educational institutions for children'.

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